



What a Bohr!

Sarah Hull
WVPT
Harrisonburg

Curriculum Area	Science
Subject Area	Physical Science
Grade Level	8 th grade
Learning Objectives	<ul style="list-style-type: none"> • The student will define and describe an atom. • The student will identify and illustrate parts of an atom, including functions. • The student will investigate the Bohr atomic model. • The student will compare and contrast the Bohr atomic model to another accepted model. • The student will create their own atomic model.
Correlation to the SOL	Science PS.1 (d,f,g), PS.3 C/T 8.1, 8.2, 8.4
Video/Technology Hardware/Software Needed	<p>For class: TV Monitor/Videodisc Player</p> <p>For each student: Computer with Internet connection, attached to a printer Word Processing software (such as <i>ClarisWorks</i> or <i>Microsoft Word</i>) Drawing software (such as <i>CorelDraw</i> or <i>KidPix</i>)</p> <p>Videodisc: <i>Windows on Science: Physical Science, Exploring Atoms</i></p>
Materials Required	<p>For each group of 3-4 students: A copy of the lab, Here An Atom, There An Atom Toothpicks (at least 50) Gum drops or gummi bears (various colors)</p> <p>For each student: A copy of the Web activity, Atoms Away A copy of the Project Instructions A copy of the Evaluation Rubric</p>

Procedures/Activities	<ol style="list-style-type: none"> 1. Lead students in discussion about the smallest objects they have ever seen. Discuss how even small objects are made up of parts. 2. Use the <i>Physical Science, Exploring Atoms</i> videodisc, take a virtual tour of an atom with students. Highlight and discuss: definition of an atom, parts of the atom and function of the atom and its parts. 3. (TIPS for remembering parts of an atom: neutron- neutral- put a car in neutral to coast electron- electrified- it would be an electrifying or negative experience to get hit by lightening proton- positive- if you are in favor of chewing gum in school you are for it- you positively want it) 4. Lead a discussion concerning how we know atoms exist. Introduce the Bohr model. 5. Divide students into small groups of 3-4 students. 6. Distribute lab, Here an Atom, There an Atom. Review steps, then distribute lab equipment. 7. Monitor student work and group interaction. 8. Allow groups to share models. Discuss similarities and differences. 9. Distribute copies of Web worksheet, Atoms Away. Review steps and allow students to begin individual research. 10. Monitor student research and writing. (Allow 2-3 days for research and writing thesis). 11. Collect and grade each thesis. 12. Distribute Project Instructions. The project requires students to: <ul style="list-style-type: none"> • Use any drawing software available to create a computer model • Use tangible materials to create a 3-D model 13. Evaluate using Rubric.
Content Assessment	<p>Were students able to successfully:</p> <ol style="list-style-type: none"> a. identify and define all parts of an atom? b. describe the function of the Bohr model? c. compare and contrast the Bohr model to another accepted model? d. develop a thesis stating which model is best and why? e. create an original computer-generated or 3-D atomic model that includes all parts of an atom
Technology Integration Assessment	See attached rubric
Extensions	<p>Science: Invite a chemist to speak on the importance of understanding atoms in the 21st century.</p> <p>Technology: Encourage students to post thesis on the web in a discussion forum where they may be read and responded to by fellow classmates and students in other schools. OR post original models on the school's Web site.</p> <p>English: Research the personal life of Bohr and what led him to his discovery. Write a biography.</p> <p>History: Research the place the idea of "atom" has played in philosophy and science through the ages.</p>

Here An Atom, There An Atom

Name _____ Date _____

They are everywhere! There is no escaping the presence of an atom. This is hard to believe considering we can't see them with our human eyes. Scientists, like Niels Bohr, have created models of atoms to help give us a better understanding of what they are and how they function. Follow the steps below to create your own tasty atom!

GATHERING INFORMATION

1. In your own words, define "Atom":

2. Name the three basic parts of an atom:

3. Use the gummi candy and toothpicks in your lab tray to construct a model of an atom with the following configuration.

neutrons: 3

protons: 2

electrons: 2

Use a different color for each part and make sure all possible connections are made.

If there is enough candy, each group member may make their own.

4. Draw a detailed, labeled illustration of your model, including a key:

ANALYZE and CONCLUDE:

1. Has your definition of "Atom" changed? Why or why not?

2. What did you notice about the number of protons and electrons? Is this always true?

3. Share your model with a classmate not in your group. Have them sign below and briefly describe how easy or difficult your model is to understand:

4. If you were Neils Bohr what materials would you use to construct a more accurate model? Provide a rationale for each item.

ATOMS AWAY- WHAT A BOHR!

Web Activity

Name _____ Date _____

Atoms aren't really "bohring". They are quite fascinating when you discover how much they reveal about the world around us. You will now use the Internet as a strategic tool to gather more information about atoms and the man behind them, Neils Bohr. Your job is to follow the detailed directions to compare Bohr's model to another accepted model. After your comparison, you are to write a brief thesis, explaining which model you think is best and why. Your thesis must state your belief and include 3 reasons why.

Ready, Set, Search!

1. Go to the URL and type in <http://education.jlab.org/atomtour/>

2. What does this site immediately say that atoms are?

3. How many atoms occur naturally?

4. Click "Continue."

5. When protons and neutrons join together, what do they form?

6. Click "Fun Facts."

7. What do neutrons and protons almost have the same?

8. Click "Continue."

9. Think back to our lab. According to this web site, do atoms always have as many electrons as protons? Does this agree with your lab?

10. Scroll to the bottom of the page. Click "Students."

11. Click "What is Matter?"

12. Click on Lab page 1

13. Read this page carefully. (When done click "next page" to read the other page-stop after the 2nd page). Create a chart detailing year, scientist, and discovery made about atoms. Make sure to include sketches that were helpful.

14. On the tool bar, click "Search."

15. Search for information about Neils Bohr and his atomic model.

16. Make a chart detailing information you deem important. Make sure to include the Web address for every site you visit and what information you gathered from that specific site. (you may use a spreadsheet or draw a chart)

17. Compare the two charts and gather any other information necessary.

18. Use the computer to type a thesis stating which model you think most accurately represents atoms and why. Make sure to include your name, date, class period and three reasons supporting your thesis. You must double space, use a size 12 readable font, and double space.

19. Attach your thesis and charts to this web activity worksheet before turning it in.

WHAT A BOHR!

Project Instructions

Wow! You have successfully navigated around the web to explore the many faces of atoms. Now is time to put your imagination to work.

The scenario: A high tech Physics Lab in Australia has been working to create a new model of an atom. They thought they had the perfect design, when poof! it vanished. You as highly intelligent budding scientists have been commissioned to redesign a model meeting the following requirements:

1. Include all parts of an atom
2. Have a specific design and color code for each part of the atom
3. Describe the function of each part of the atom
4. Describe how your model could be used in a classroom setting
5. Build a 3-D model of your atom
6. Give your model a catchy, intriguing name
7. Provide a rationale for why you used various materials to create your atom.
8. Display a computer generated blueprint of your model using: Appleworks, Corel Draw, PowerPoint, HyperStudio, etc.

Remember you have many resources to use. Take your time. Be neat and thorough!

Include family members and friends when possible!

WHAT A BOHR Rubric

Student Name _____

Parts of Atom	2 pts - Included all parts of an atom	1 pt - Included 2 parts of an atom	0 pts - Included no parts of an atom	
Design	2 pts - Had a specific design and color code for each part of the atom	1 pt - Included a design that varied slightly and color scheme could have been more precise	0 pts - Included no design or color scheme	
Function	2 pts - Described the function of each part of the atom	1 pt - Described the function of only 2 parts of the atom	0 pts - Did not describe the parts of an atom	
Usability	2 pts - Described how your model could be used in a classroom setting	1 pt - Needed to provide a more detailed description of how to use in a classroom	0 pts - Gave no description	
3-D Model	2 pts - Built a 3-D model of your atom	1 pt - Constructed a model that was not 3-D	0 pts - Provided no model of an atom	
Name	2 pts - Gave your model a catchy, intriguing name	1 pt - Name could reflect more creativity	0 pts - Name had nothing to do with model	
Rationale	2 pts - Provided a rationale for why you used various materials to create your atom	1 pt - Provided some rationale but needed more detail	0 pts - provided no rationale	
Computer Model	2 pts - Displayed a computer generated blueprint of your model using, Appleworks, Corel Draw, PowerPoint, HyperStudio, etc.	1 pt - Displayed a hand drawn blue print	0 pts - Provided no blueprint	
			TOTAL POINTS:	

BOHRACIOUS - A (15-16 pts)
BOHRDERLINE - B-C (14-13 pts.)
BOHRING - D or below (12 or fewer pts.)